CYM1841
CYM1841A

256K x 32 Static RAM Module

Features

- **High-density 8-megabit SRAM module**
- **32-bit standard footprint supports densities from 16K x 32 through 1M x 32**
- **High-speed CMOS SRAMs**
  - **Access time of 12 ns**
- **Low active power**
  - **5.3W (max.) at 25 ns**
- **SMD technology**
- **TTL-compatible inputs and outputs**
- **Low profile**
  - **Max. height of 0.58 in.**
- **Available in ZIP, SIMM, and angled SIMM footprint**
- **72-pin SIMM version compatible with 1M x 32 (CYM1851)**

Functional Description

The CYM1841/1841A is a high-performance 8-megabit static RAM module organized as 256K words by 32 bits. This module is constructed from eight 256K x 4 SRAMs in SOJ packages mounted on an epoxy laminate board with pins. Four chip selects ($\overline{CS}_1$, $\overline{CS}_2$, $\overline{CS}_3$, $\overline{CS}_4$) are used to independently enable the four bytes. Reading or writing can be executed on individual bytes or any combination of multiple bytes through proper use of selects.

Writing to each byte is accomplished when the appropriate chip select ($\overline{CS}$) and write enable ($\overline{WE}$) inputs are both LOW. Data on the input/output pins (I/O) is written into the memory location specified on the address pins (A_0 through A_{17}).

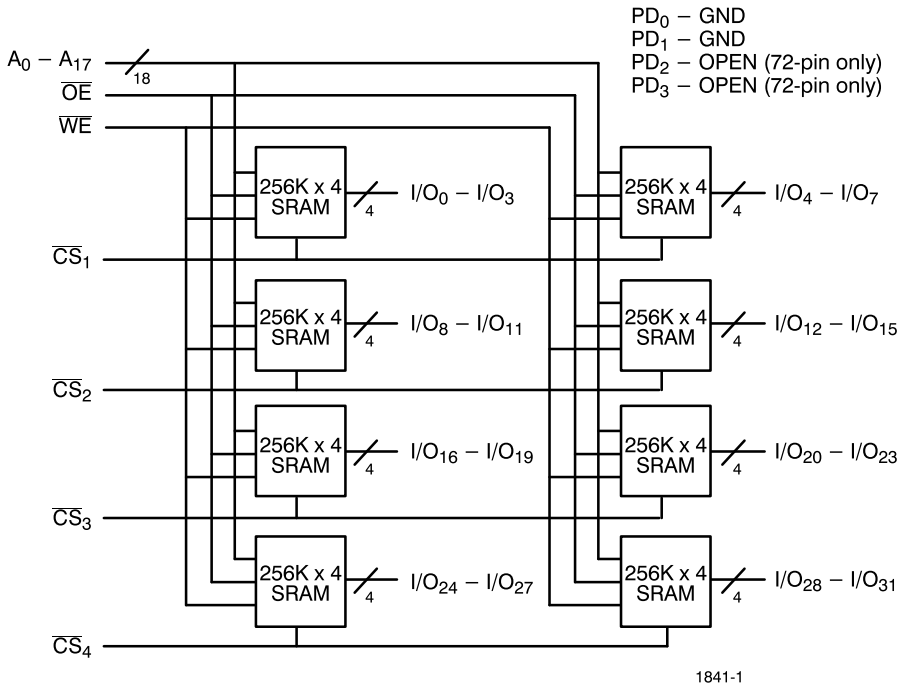
Reading the device is accomplished by taking the chip select ($\overline{CS}$) LOW while write enable ($\overline{WE}$) remains HIGH. Under these conditions, the contents of the memory location specified on the address pins will appear on the data input/output pins (I/O).

The data input/output pins stay at the high-impedance state when write enable is LOW or the appropriate chip selects are HIGH.

Two pins (PD_0 and PD_1) are used to identify module memory density in applications where alternate versions of the JEDEC-standard modules can be interchanged.

A 72-pin SIMM is offered for compatibility with the 1M x 32 CYM1851. This version is socket upgradable to the CYM1851.

Logic Block Diagram



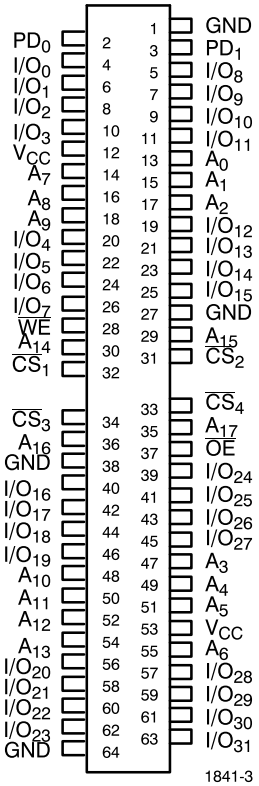
Selection Guide

	1841A−12	1841A−15	1841−20 1841A−20	1841−25 1841A−25	1841−30 1841A−30	1841−35 1841A−35	1841−45 1841A−45	1841−55 1841A−55
Maximum Access Time (ns)	12	15	20	25	30	35	45	55
Maximum Operating Current (mA)	1600	1600	1120	960	960	960	960	960
Maximum Standby Current (mA)	480	480	480	480	480	480	480	480

Shaded area contains preliminary information.

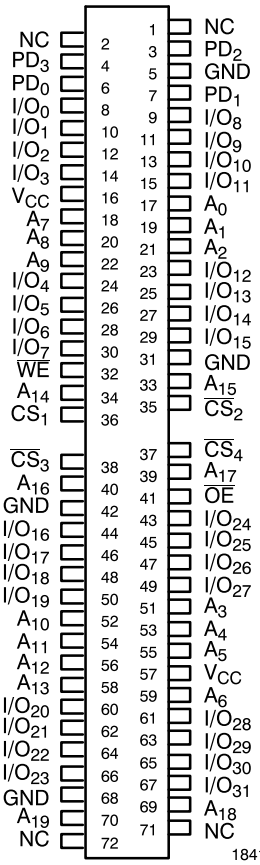
Pin Configurations (continued)

64-Pin ZIP/SIMM Top View



1841-3

72-Pin (1841AP7 only) SIMM Top View



1841-2

Maximum Ratings

(Above which the useful life may be impaired. For user guidelines, not tested.)

Storage Temperature ..... − 55°C to +125°C

Ambient Temperature with Power Applied ..... −10°C to +85°C

Supply Voltage to Ground Potential ..... − 0.5V to +7.0V

DC Voltage Applied to Outputs in High Z State ..... − 0.5V to +7.0V

DC Input Voltage ..... − 0.5V to +7.0V

Operating Range

Range	Ambient Temperature	V_{CC}
Commercial	0°C to +70°C	5V ± 10%

Electrical Characteristics Over the Operating Range

Parameter	Description	Test Conditions	1841A−12 1841A−15		1841−20 1841A−20		1841−25, 30, 35, 45, 55 1841A−25, 30, 35, 45, 55		Unit
			Min.	Max.	Min.	Max.	Min.	Max.	
V_{OH}	Output HIGH Voltage	V_{CC} = Min., I_{OH} = − 4.0 mA	2.4		2.4		2.4		V
V_{OL}	Output LOW Voltage	V_{CC} = Min., I_{OL} = 8.0 mA		0.4		0.4		0.4	V
V_{IH}	Input HIGH Voltage		2.2	V_{CC}	2.2	V_{CC}	2.2	V_{CC}	V
V_{IL}	Input LOW Voltage		− 0.5	0.8	− 0.5	0.8	− 0.5	0.8	V
I_{IX}	Input Leakage Current	GND ≤ V_I ≤ V_{CC}	− 16	+16	− 16	+16	− 16	+16	µA
I_{OZ}	Output Leakage Current	GND ≤ V_O ≤ V_{CC}, Output Disabled	− 10	+10	− 10	+10	− 10	+10	µA
I_{CC}	V_{CC} Operating Supply Current	V_{CC} = Max., I_{OUT} = 0 mA, $\overline{CS}$ ≤ V_{IL}		1600		1120		960	mA
I_{SB1}	Automatic $\overline{CS}$ Power-Down Current[1]	Max. V_{CC}, $\overline{CS}$ ≥ V_{IH}, Min. Duty Cycle = 100%		480		480		480	mA
I_{SB2} 1841	Automatic $\overline{CS}$ Power-Down Current[1]	Max. V_{CC}, $\overline{CS}$ ≥ V_{CC} − 0.2V, V_{IN} ≥ V_{CC} − 0.2V, or V_{IN} ≤ 0.2V				16		16	mA
I_{SB2} 1841A	Automatic $\overline{CS}$ Power-Down Current[1]	Max. V_{CC}, $\overline{CS}$ ≥ V_{CC} − 0.2V, V_{IN} ≥ V_{CC} − 0.2V, or V_{IN} ≤ 0.2V		240		120		120	mA

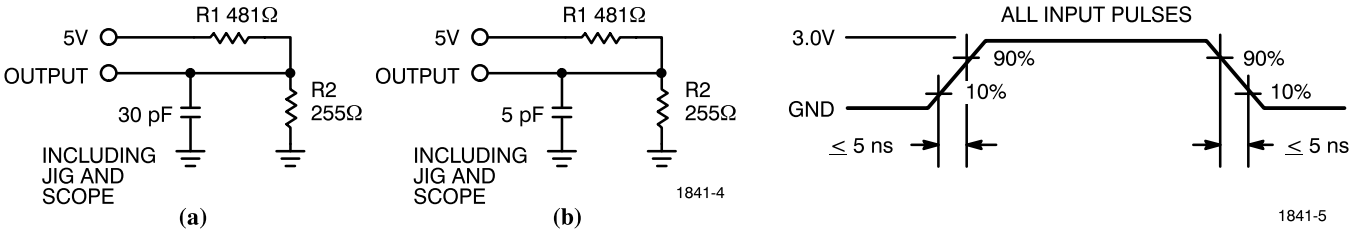
Shaded area contains preliminary information.

Capacitance[2]

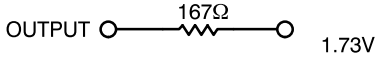
Parameter	Description	Test Conditions	Max.	Unit
C_{IN}	Input Capacitance[3]	T_A = 25°C, f = 1 MHz, V_{CC} = 5.0V	70/20	pF
C_{OUT}	Output Capacitance		20	pF

Note:
1. A pull-up resistor to V_{CC} on the $\overline{CS}$ input is required to keep the device deselected during V_{CC} power-up, otherwise I_{SB} will exceed values given.
2. Tested on a sample basis.
3. 20 pF on $\overline{CS}$, 70 pF all others.

AC Test Loads and Waveforms



Equivalent to: THÉVENIN EQUIVALENT



Switching Characteristics Over the Operating Range[4]

Parameter	Description	1841A−12		1841A−15		1841−20 1841A−20		1841−25 1841A−25		1841−30 1841A−30		Unit
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
READ CYCLE												
t_{RC}	Read Cycle Time	12		15		20		25		30		ns
t_{AA}	Address to Data Valid		12		15		20		25		30	ns
t_{OHA}	Output Hold from Address Change	3		3		3		3		3		ns
t_{ACS}	$\overline{CS}$ LOW to Data Valid		12		15		20		25		30	ns
t_{DOE}	$\overline{OE}$ LOW to Data Valid		7		8		13		15		20	ns
t_{LZOE}	$\overline{OE}$ LOW to Low Z	0		0		0		0		0		ns
t_{HZOE}	$\overline{OE}$ HIGH to High Z		7		8		15		15		15	ns
t_{LZCS}	$\overline{CS}$ LOW to Low Z[5]	3		3		10		10		10		ns
t_{HZCS}	$\overline{CS}$ HIGH to High Z[5, 6]		7		8		20		20		20	ns
WRITE CYCLE[7]												
t_{WC}	Write Cycle Time	12		15		20		25		30		ns
t_{SCS}	$\overline{CS}$ LOW to Write End	9		10		15		20		25		ns
t_{AW}	Address Set-Up to Write End	9		10		18		20		25		ns
t_{HA}	Address Hold from Write End	0		0		0		0		0		ns
t_{SA}	Address Set-Up to Write Start	1		1		2		2		2		ns
t_{PWE}	$\overline{WE}$ Pulse Width	10		12		15		20		25		ns
t_{SD}	Data Set-Up to Write End	7		8		13		15		15		ns
t_{HD}	Data Hold from Write End	1		1		2		2		2		ns
t_{LZWE}	$\overline{WE}$ HIGH to Low Z	0		0		0		0		0		ns
t_{HZWE}	$\overline{WE}$ LOW to High Z[6]	0	5	0	7	0	15	0	15	0	15	ns

Shaded area contains preliminary information.

Switching Characteristics Over the Operating Range (continued)[4]

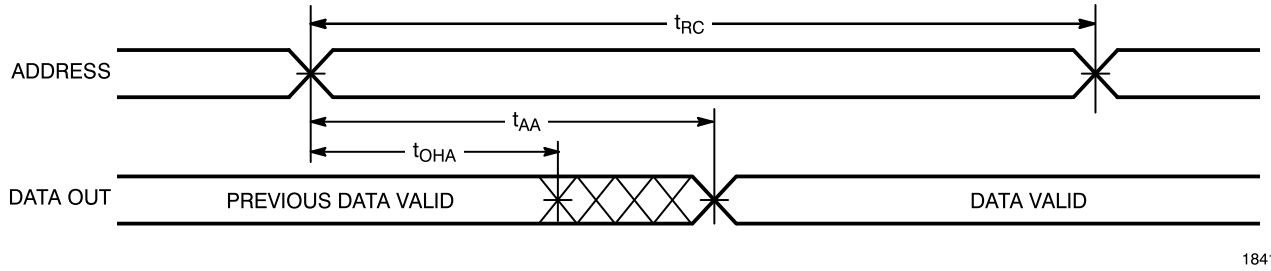
Parameter	Description	1841−35 1841A−35		1841−45 1841A−45		1841−55 1841A−55		Unit
		Min.	Max.	Min.	Max.	Min.	Max.	
READ CYCLE								
t_{RC}	Read Cycle Time	35		45		55		ns
t_{AA}	Address to Data Valid		35		45		55	ns
t_{OHA}	Data Hold from Address Change	3		3		3		ns
t_{ACS}	$\overline{CS}$ LOW to Data Valid		35		45		55	ns
t_{DOE}	$\overline{OE}$ LOW to Data Valid		25		30		35	ns
t_{LZOE}	$\overline{OE}$ LOW to Low Z	0		0		0		ns
t_{HZOE}	$\overline{OE}$ LOW to High Z		15		15		15	ns
t_{LZCS}	$\overline{CS}$ LOW to Low Z[5]	10		10		10		ns
t_{HZCS}	$\overline{CS}$ HIGH to High Z[5, 6]		20		20		20	ns
t_{PD}	$\overline{CS}$ HIGH to Power-Down		35		45		55	ns
WRITE CYCLE[7]								
t_{WC}	Write Cycle Time	35		45		55		ns
t_{SCS}	$\overline{CS}$ LOW to Write End	30		40		50		ns
t_{AW}	Address Set-Up to Write End	30		40		50		ns
t_{HA}	Address Hold from Write End	2		2		2		ns
t_{SA}	Address Set-Up to Write Start	2		2		2		ns
t_{PWE}	$\overline{WE}$ Pulse Width	30		35		45		ns
t_{SD}	Data Set-Up to Write End	20		25		35		ns
t_{HD}	Data Hold from Write End	2		2		2		ns
t_{LZWE}	$\overline{WE}$ HIGH to Low Z	0		0		0		ns
t_{HZWE}	$\overline{WE}$ LOW to High Z[6]	0	15	0	15	0	15	ns

Notes:

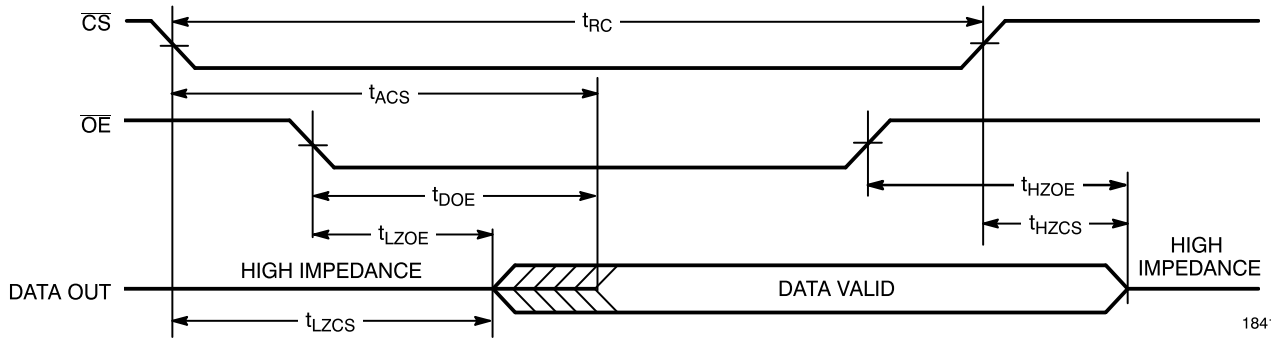
4. Test conditions assume signal transition times of 5 ns or less, timing reference levels of 1.5V, input pulse levels of 0 to 3.0V, and output loading of the specified I_{OL}/I_{OH} and 30-pF load capacitance.
5. At any given temperature and voltage condition, t_{HZCS} is less than t_{LZCS} for any given device. These parameters are guaranteed by design and not 100% tested.
6. t_{HZCS} and t_{HZWE} are specified with $C_L = 5$ pF as in part (b) of AC Test Loads and Waveforms. Transition is measured ±500 mV from steady-state voltage.
7. The internal write time of the memory is defined by the overlap of $\overline{CS}$ LOW and $\overline{WE}$ LOW. Both signals must be LOW to initiate a write and either signal can terminate a write by going HIGH. The data input set-up and hold timing should be referenced to the rising edge of the signal that terminates the write.

Switching Waveforms

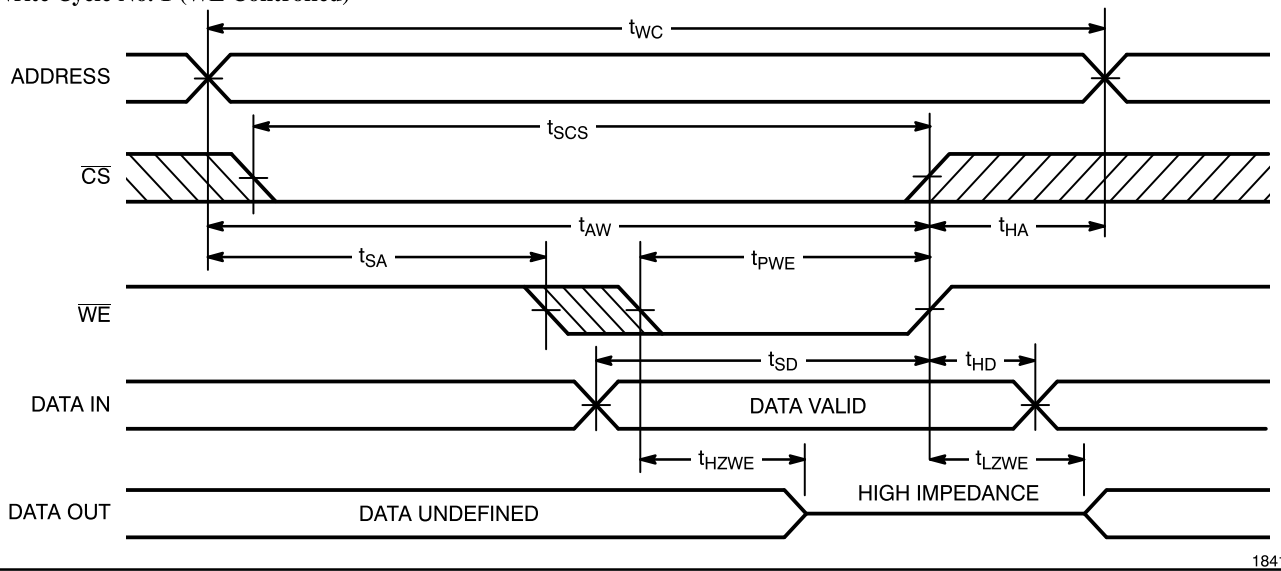
Read Cycle No. 1[8, 9]



Read Cycle No. 2[8, 10]



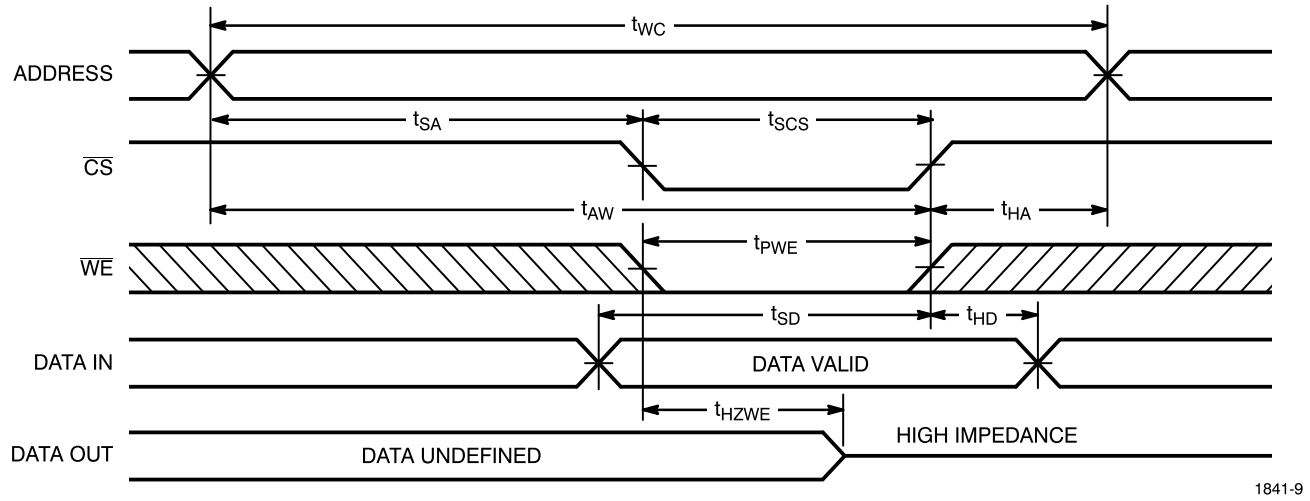
Write Cycle No. 1 ($\overline{WE}$ Controlled)[7]



Notes:
8. $\overline{WE}$ is HIGH for read cycle.
9. Device is continuously selected, $\overline{CS}$ = V_{IL} and $\overline{OE}$= V_{IL}.
10. Address valid prior to or coincident with $\overline{CS}$ transition LOW.

Switching Waveforms (continued)

Write Cycle No. 2 ($\overline{CS}$ Controlled)[7, 11]



Notes:
11. If $\overline{CS}$ goes HIGH simultaneously with $\overline{WE}$ HIGH, the output remains in a high-impedance state.

Truth Table

$\overline{CS}$	$\overline{WE}$	$\overline{OE}$	Input/Output	Mode
H	X	X	High Z	Deselect/Power-Down
L	H	L	Data Out	Read
L	L	X	Data In	Write
L	H	H	High Z	Deselect

Ordering Information

Speed (ns)	Ordering Code	Package Name	Package Type	Operating Range
12	CYM1841APM−12C	PM02	64-Pin Plastic SIMM Module	Commercial
	CYM1841APN−12C	PN02	64-Pin Plastic Angled SIMM Module	
	CYM1841APZ−12C	PZ03	64-Pin Plastic ZIP Module	
15	CYM1841APM−15C	PM02	64-Pin Plastic SIMM Module	Commercial
	CYM1841AP7−15C	PM04	72-Pin Plastic SIMM Module	
	CYM1841APN−15C	PN02	64-Pin Plastic Angled SIMM Module	
	CYM1841APZ−15C	PZ03	64-Pin Plastic ZIP Module	
20	CYM1841PM−20C	PM02	64-Pin Plastic SIMM Module	Commercial
	CYM1841P7−20C	PM04	72-Pin Plastic SIMM Module	
	CYM1841PN−20C	PN02	64-Pin Plastic Angled SIMM Module	
	CYM1841APM−20C	PM02	64-Pin Plastic SIMM Module	
	CYM1841AP7−20C	PM04	72-Pin Plastic SIMM Module	
	CYM1841APN−20C	PN02	64-Pin Plastic Angled SIMM Module	
	CYM1841APZ−20C	PZ03	64-Pin Plastic ZIP Module	
25	CYM1841PM−25C	PM02	64-Pin Plastic SIMM Module	Commercial
	CYM1841P7−25C	PM04	72-Pin Plastic SIMM Module	
	CYM1841PN−25C	PN02	64-Pin Plastic Angled SIMM Module	
	CYM1841APM−25C	PM02	64-Pin Plastic SIMM Module	
	CYM1841AP7−25C	PM04	72-Pin Plastic SIMM Module	
	CYM1841APN−25C	PN02	64-Pin Plastic Angled SIMM Module	
	CYM1841APZ−25C	PZ03	64-Pin Plastic ZIP Module	
30	CYM1841PM−30C	PM02	64-Pin Plastic SIMM Module	Commercial
	CYM1841P7−30C	PM04	72-Pin Plastic SIMM Module	
	CYM1841PN−30C	PN02	64-Pin Plastic Angled SIMM Module	
	CYM1841APM−30C	PM02	64-Pin Plastic SIMM Module	
	CYM1841AP7−30C	PM04	72-Pin Plastic SIMM Module	
	CYM1841APN−30C	PN02	64-Pin Plastic Angled SIMM Module	
	CYM1841APZ−30C	PZ03	64-Pin Plastic ZIP Module	
35	CYM1841PM−35C	PM02	64-Pin Plastic SIMM Module	Commercial
	CYM1841P7−35C	PM04	72-Pin Plastic SIMM Module	
	CYM1841PN−35C	PN02	64-Pin Plastic Angled SIMM Module	
	CYM1841APM−35C	PM02	64-Pin Plastic SIMM Module	
	CYM1841AP7−35C	PM04	72-Pin Plastic SIMM Module	
	CYM1841APN−35C	PN02	64-Pin Plastic Angled SIMM Module	
	CYM1841APZ−35C	PZ03	64-Pin Plastic ZIP Module	

Ordering Information (continued)

Speed (ns)	Ordering Code	Package Name	Package Type	Operating Range
45	CYM1841PM−45C	PM02	64-Pin Plastic SIMM Module	Commercial
	CYM1841P7−45C	PM04	72-Pin Plastic SIMM Module	
	CYM1841PN−45C	PN02	64-Pin Plastic Angled SIMM Module	
	CYM1841APM−45C	PM02	64-Pin Plastic SIMM Module	
	CYM1841AP7−45C	PM04	72-Pin Plastic SIMM Module	
	CYM1841APN−45C	PN02	64-Pin Plastic Angled SIMM Module	
	CYM1841APZ−45C	PZ03	64-Pin Plastic ZIP Module	
55	CYM1841PM−55C	PM02	64-Pin Plastic SIMM Module	Commercial
	CYM1841P7−55C	PM04	72-Pin Plastic SIMM Module	
	CYM1841PN−55C	PN02	64-Pin Plastic Angled SIMM Module	
	CYM1841APM−55C	PM02	64-Pin Plastic SIMM Module	
	CYM1841AP7−55C	PM04	72-Pin Plastic SIMM Module	
	CYM1841APN−55C	PN02	64-Pin Plastic Angled SIMM Module	
	CYM1841APZ−55C	PZ03	64-Pin Plastic ZIP Module	

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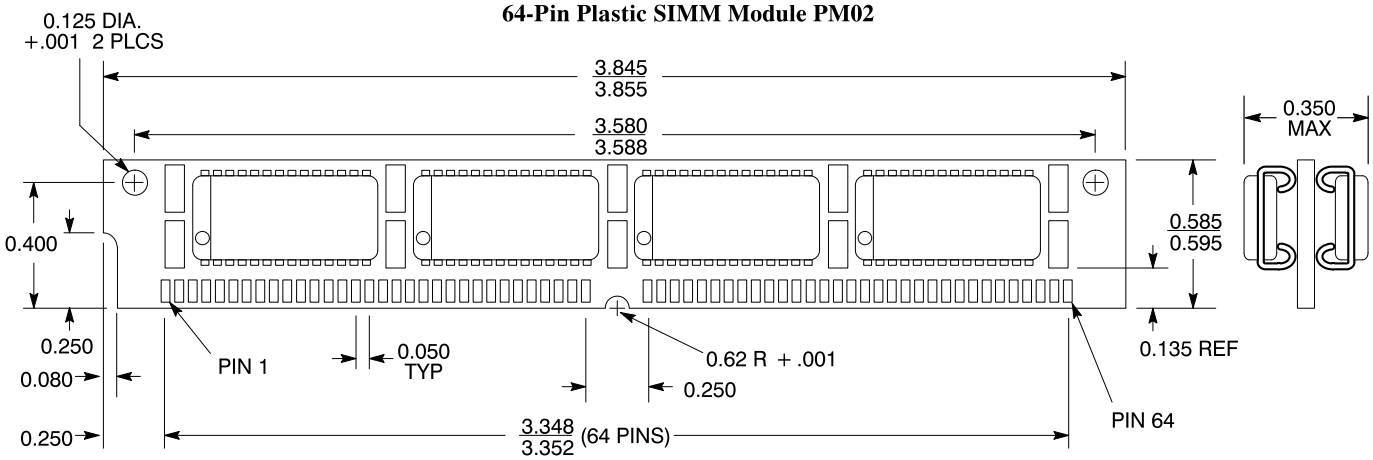
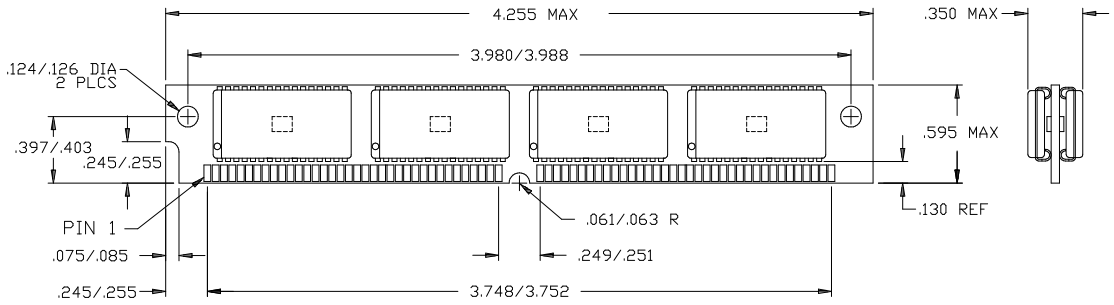
Package Diagrams

64-Pin Plastic SIMM Module PM02

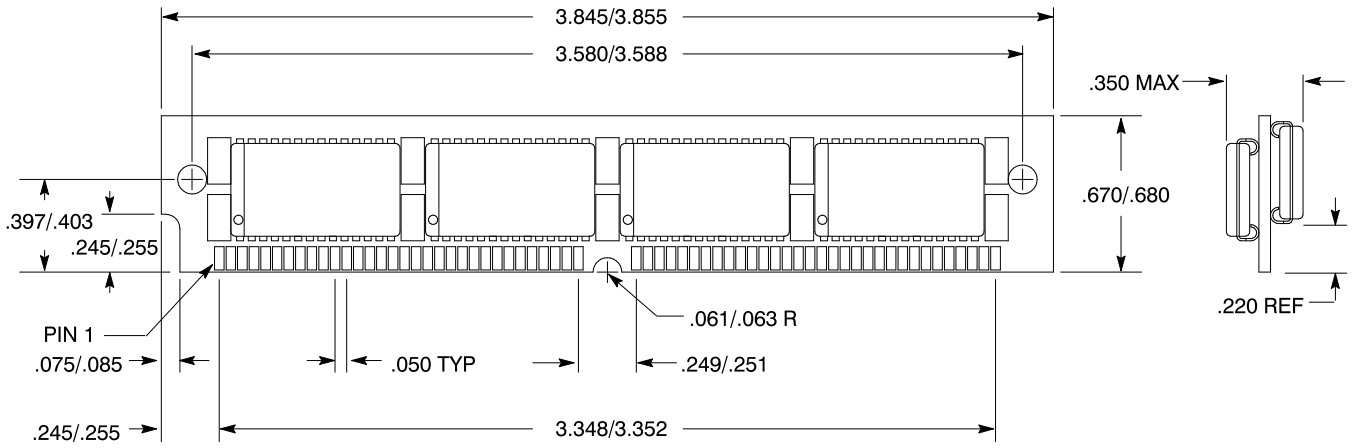


72-Pin Plastic SIMM Module PM04



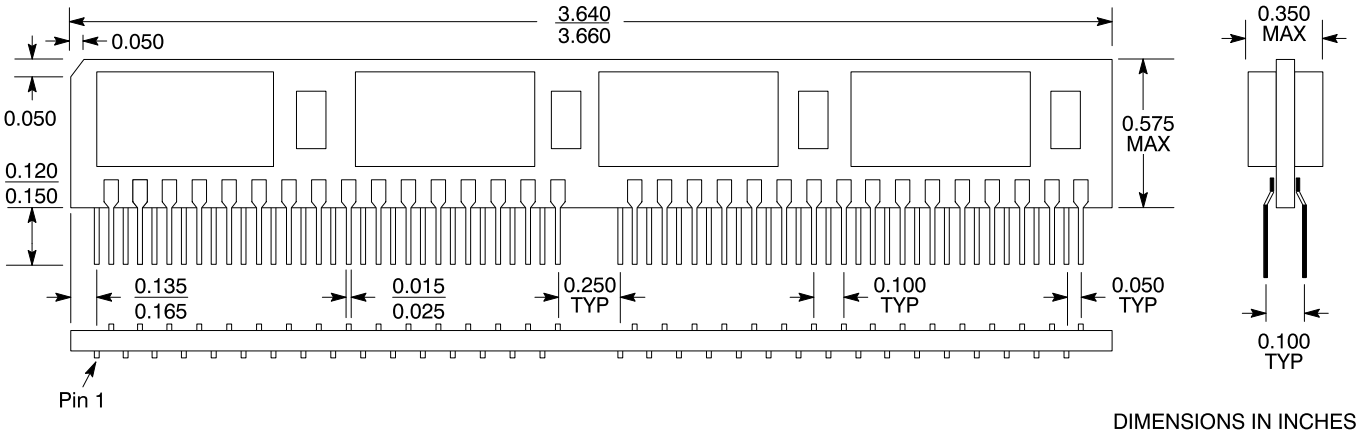
Package Diagrams (continued)

64-Pin Plastic Angled SIMM Module PN02



64-Pin Plastic ZIP Module PZ03

Bottom View



DIMENSIONS IN INCHES

MIN.
MAX.